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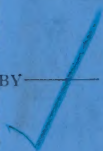
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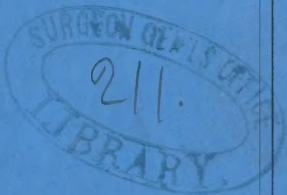
*Malaria, and its Effects ;*

—BY—



J. W. YOUNGE, M. D.

*Compliments*



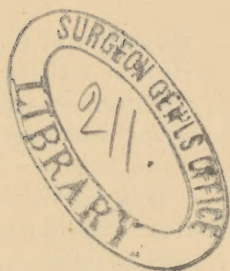
A knowledge of curative and preventive medicine is not to be learned in the dissecting-room of a medical school, or in the dead-house of a hospital.—STOKES.

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## PREFACE.

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**T**HE first edition of *Malaria and Its Effects*, was written when the author was personally suffering from the effects of the poison of Malaria as manifested in one of its most aggravated features. The deductions and conclusions, as regards its character, mode of operation and issue, in the human economy, were inferred from close and persistent clinical observation, as obviously developed in his own organization. The accurate knowledge thus acquired relative to this element as a source of disease, its etiology, pathology, and the most desirable therapeutics, was based upon personal experience, and subsequently have been verified by application and clinical observation upon others. As a physician, I would be slow to desire the afflicted to follow my example in this matter; but rather endeavor to persuade them to occupy their minds in a different channel and turn it away in some measure from dwelling only on the morbid conditions and tortures of the body.

But being interested in the welfare of others, I availed myself of the opportunity of studying in my organization the phenomena not infrequently witnessed in others, and made it my daily occupation to write of them in a scientific character, in so far as my intellectual qualifications permitted. However fascinating, or strong the temptation may be to a physician, to devote his time and abilities to the purely scientific departments of his profession, he must not permit himself to be led away from such investigations as have a practical bearing upon the prevention, relief and cure of diseases. Believing that the poison of Malaria is productive of diseases which affect the largest number of persons in this country; therefore, I have not hesitated to devote a large amount of time and study to

the subject of this treatise. The mode of origin of the toxical element of Malaria, the manner of its introduction into the system, and its effects upon the human economy, have not yet been investigated with sufficient care. I trust that the following treatise may throw some new light upon this important subject.

Believing that I have asserted nothing but facts, I have no hesitation in meeting scientists, critics, and book reviewers, on the free field of inference. But when a criticism bears upon its face irrefragable evidence of being the emanation of personal malice, or jealousy, I shall not so far forget my duty to my calling, or so far compromise my faith as to acknowledge the notice of such critique.

May 1, 1880.

J. W. Y.



# *Malaria, and its Effects ;*

—BY—

J. W. YOUNGE, M. D.

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**N**OTHING so fetters independence in thought and originality in action, as a blind adherence to a prevailing theory, past or present, and a settled conviction that this or that theory of disease, or system of practice, is the correct one.

The student who is a keen observer, who correctly interprets nature, and disease, assisted by native common sense and wholesome reading, may, and can become an authority unto himself; not positive and dogmatic; but, while willing to be guided by so-called “authorities,” still not to be ruled entirely by their dicta. Blind submission to authority on the one hand, and obstinate adherence to settled views on the other, are opposed to any real progress in medicine as a science, or as an art.

This is eminently a practical age, in which short cuts to the acquisition of knowledge are to be preferred to means more laborious and circuitous. If we take a retrospect of some twenty or thirty years, and inquire into the opinions and theories of some of the most conspicuous and experienced authors, on the cause and nature

of intermittent fever, we shall find much to interest, instruct and furnish food for future thought. If we take the views of Broussais, Boerhaave, Willis, Silvio, Cullen, Torti, Bally, Roche, Adouard, Boudin and Priorry, as regards the nature and effects of malaria, we will see that no two of them are agreed, as regards the etiology and pathology of the periodical fevers.

In 1866, Prof. J. H. Salisbury, of Cleveland, Ohio, put forth a paper worthy of note on the cause of intermittent fever. In this paper, Prof. S. claims to have discovered that this fever is the result of introducing into the system, germs or spores emanating from the lowest known vegetable organism. It is now thirteen years since Dr. Salisbury advanced this theory, which is apparently consistent with some well known facts relating to the cause of the disease above referred to; yet, his observations have not been confirmed by other authorities, equally as able and searching as himself, and the validity of the theory above adverted to is not generally recognized at the present time. While the cryptogamic theory of malaria has many able advocates; yet, I am constrained to express a conviction that the germ theory cannot be demonstrated.

In 1879, Profs. Klebs and Tommasi-Crudelli claimed, that, according to their observations as regards the nature of malaria, it is an organism belonging to the genus *bacillus*, and that in the soil of malarious regions it is found in the form of numerous spores which possess the power of independent motion and strongly refracts the light. They also claim that after the introduction of these germs into the body, they are eternal and can never be eliminated; they furthermore explain their theory on the supposition that these spores remain circulating as a rule in the portal blood, and only occasionally get into the general circulation. This is a mere hypothesis. While this is virtually the same as Prof. Salisbury's statement regarding malaria, yet it is destroyed by the *modus operandi* of quinia upon these germs in cases of intermittent fever, as given by Profs. Klebs and Tommasi-Crudelli, which is not in accord with known demonstrable facts, and to a certain extent militates very strongly against the germ theory.

At this point in the writing of this treatise, I had the pleasure of a conversation with Prof. W. H. Myers, of Fort Wayne, Ind., upon the subject of the germ theory of the periodical fevers. Prof.

Myers has studied with great zeal the question of germs and fungi ; yet I am admonished by stern facts, that his views upon this topic are wholly theoretical and will not affirmatively respond to the test of scientific investigation. Scientists state that a *germ* is the rudiment of a new being, either animal or vegetable ; a living particle, capable, under certain circumstances, in which its susceptibility is brought into contact with its affinity, of propagating or developing new forms of life, producing changes in the body by a zymotic or putrefactive proceeding ; the germs being the cause and disease the result of such changes induced by such poison. To the advocates of the germ theory of malarial fever, I here respectfully take the liberty of asking whether the germs are held in solution, or in suspension in the blood, after their introduction into the body ?

If the germ theory, as at present advanced by its advocates, was the truth, the whole truth, and nothing but the truth, what interpretation is to be given of phenomenon witnessed daily—the kindly and rapid healing of exposed wounds ? Now, if an individual who had no clinical experience from which to deduce facts, accepts as true all that has been said and written upon the germ *theory* ; he will be compelled to arrive at the conclusion that to expose a wound to the atmosphere would be productive of the death of the patient. But we know that not only do exposed, or unguarded wounds heal rapidly by a healthy repairing process, but we sometimes see wounds bathed in a fluid which if injected into the veins would be productive of septicaemia. This fact proves conclusively that the poisonous matter must be transmitted to, and in the blood, in order to be efficient as a causative agent of disease. The subject of blood poisoning is an interesting one for the physician. A struggle is now being enacted in Europe and America, as regards the germ *theory* ; and the method of preventing the so-called germs from entering the organization. The plan advocated as being successful in the exclusion of living germs from the system in cases of wounds, is known as Lister's method. The reader will not be unprepared for me to state that I am not an enthusiast upon the subject of Listerism. I have endeavored to be a very diligent student for several years of everything connected with the science of medicine, and so far have been unable to discover any demonstrable fact that could exert even a tendency to establish the truth of morbid atmospheric germs. I have found



great amplitude of affirming declarations, devoid of even the shadow of logical and scientific corroborative evidence, enunciated to confirm the germ theory, and therefore unworthy of acceptance. It is with no small amount of diffidence that I thus refer to Listers' antiseptic treatment; inasmuch as many eminent surgeons have endorsed it—perhaps because it was a new fashion. Fashion and enthusiasm in medicine, are, however, very dangerous pretenders to scientific credit, and should be met by cool, deliberate reasoning, and deep, careful, unbiased investigation. It is evident that at a time when physicians and scientists are everywhere discovering infusoria, and fungi in pathological processes, it is exceedingly tempting to explain the cause of the periodical fevers on this *theory*. I believe that the day is not far distant when the advocates of the germ theory will have to modify their arguments in the sense of supposing that infusoria or fungi enter into the etiology of the fevers above adverted to. I believe it is a gas, the result of a chemical change, and do not believe one word of the germ doctrine as heretofore taught. The Apostle Paul, one of the ablest writers of antiquity, expressed a great physiological truth, when he wrote: "Thou fool, that which thou sowest is not quickened except it die." The death here referred to, consists in the change of the outer covering of the body of the germinating principle. It is absolutely essential for every germ of which we have any knowledge, to pass through two distinct classes of action. It is the death of this external covering which produces the germ. There must be the act of generation by which the *germ* is produced, and the act of development, by which the *germ* is unfolded, or expanded. We do not know one thing about, "the act of generation of an intermittent fever germ."

I believe it will be found that instead of a so-called germ entering the blood, and inaugurating a pathological war, that this fluid partakes of a toxical nature from the inhalation of a poisonous atmosphere, as the result of being impregnated with malaria, or decomposed vegetable albuminoid gas.

I earnestly wish that a sound and reliable starting point could be found for this germ theory; that somewhere within the realms of sober reason an enunciation could be asserted toward which we could gather as to an assured and demonstrable truth. No one has ever yet seen a germ of any kind that we can assuredly recognize as



having anything more to do with the production of intermittent, or remittent, or yellow fever, than with any other of the diversified operations of nature. We know nothing of its forms, nothing of its origin, nothing of its mode of operation. We absolutely know nothing of it except that which is asserted, and I ask in all candor, what right has anyone to announce as a truth that which is simply an assertion? There is not a science known to men that is built on such a basis? I have devoted considerable time to its study, and I find my hands as empty as when I first went to the fountain. The reasoning on behalf of the germ theory is labored; it is often adroitly and skillfully handled; but, it is reasoning by analogy, which is one of the most unreliable methods of reaching logical and truthful conclusions. We can take a bad atmosphere and run a long list of analogies between it and carbonic acid gas; but this analogy falls far short from demonstrating that they are identical. It is positively known that they are not; yet, I can make more specific analogies between malaria and carbonic acid gas than the advocates of the yellow or intermittent fever germ can for anything. Edmund Burke, one of the profoundest thinkers that has ever lived, says:—"Parallels of this sort rather furnish similitudes to illustrate, or adorn, than supply analogies from whence to reason."

We know a great deal about the atmosphere, that vast aerial ocean that furnishes us the pabulum of life; but there is a vast amount of interesting problems connected with it of which we know absolutely nothing. For example: Carbonic acid gas is as essential to the growth and form of vegetable life as oxygen is to animal life; but the carbonic acid gas is a fixture in vegetable forms. Now, the problem for solution is, how is this gas produced? If not renewed from some quarter, vegetable life would reach extinction. From whence comes this renewal? Those who people our air with "fever and ague germs," with dust and particles of epidemic pestilence, should direct their attention to this vital problem. While engaged in works of imagination, I am surprised that no one has thought of conjecturing that disease-producing "germs" are manufactured in planetary space. There is a vast array of invisible as well as visible meteors loading the air with planet dust. Here is a wide field of research: the destruction of these meteors.

Parkes, in his great work on Practical Hygiene, gives the "mor-  
bific atmospheric germs theory" a number of staggering blows.  
Dr. Salisbury does not fare well in Dr. Parkes' examination. The  
great sanitary works of the age are not very favorably impressed  
with the idea of "atmospheric germs" of disease. They urge,  
with great force, the all-powerful aid of perfect drainage as the  
means of securing and preserving health, in connection with proper  
ventilation and cleanliness.

This much for this shadowy domain of the "germ theory" of  
periodical fevers. We will now consider something more tangible,  
something that we may be able to comprehend. I now refer to one  
of the most immortal truths known to medical science, a truth upon  
which has been expended many of the profoundest labors of the  
tallest minds that have adorned the medical profession. The poi-  
son of malaria, unlike the "germ," is not an hypothesis. We  
know the laws of its habitude, and we know its habitude as well as  
we know anything in nature's widespread and overarching domain.

There is required a daily mean temperature of sixty degrees of  
Fahrenheit's scale for two months, with moisture and decomposing  
vegetable matter, to produce that form of malaria that is productive  
of intermittent and remittent fever. If the solar heat is persistent,  
or rises higher than the daily mean of sixty degrees, the diseases  
assume graver aspects. In the mildest form of these diseases, the  
urine always shows indubitable evidence of the character of the  
poison. This is universal. By this sign alone we may decipher  
the presence of the poison in the most obscure cases. Two persons  
may be attacked by intermittent or remittent fever at the same time.  
One of the two suffers extremely until the sweating stage, and the  
proxysm ends. The other appears to be insensible to any suffering ;  
he has no reaction ; he talks sensibly ; but he has a total suppres-  
sion of urine and is pulseless. He is collapsed, and will die just as  
certainly as that night follows day, from the effects of paralysis  
manifested in the kidneys, in the secretions and in the circulation ;  
caused by the introduction of the poison of malaria. In all the re-  
cords of medical literature, not a single recovery from the latter  
condition has ever occurred, nor has any case of the kind ever taken  
place, except as the result of the poison of malaria.

In some cases during the cold stage of intermittent fever, albumen may be found in the urine, but it will disappear upon the invasion of the fever. In yellow fever the changes in the urine embrace not only the albumen, but are indicative of a desquamative process going on in the kidneys and bladder, and belong to the natural history of this affection. It has been truly stated, by Dr. Blair, "As long as the urine passes, as black as ink, there is hope for the patient; he may struggle into convalescence." In the first stage of yellow fever the matter vomited is alkaline. The matter vomited then is a white liquid—but if albumen be present in the urine at this stage of the disease the patient never vomits this white fluid. It is albuminous and shows the momentous importance of an intimate knowledge of urinalysis and the masterful use of the microscope. The physician who attempts to treat this form of malarial disease without making himself thoroughly intimate with the character of the urine of the patient at each visit, is justly censurable.

A most valuable aid in diagnosing these diseases is found in a careful microscopical and chemical analysis of the urine. In this way we can determine the character and location of many chronic affections and especially those involving the nervous system, liver, spleen, and kidneys. The result which the analysis above adverted to produces, enables the physician to differentiate as regards the pathematology of the various affections as closely and certainly as that an expert geologist can accurately determine the rock formation from which a specimen fossil may have been taken; or, with as equal an accuracy as an electrician can locate a submarine fracture in a telegraph cable three thousand miles long. In medical science diseases have certain unmistakable signs, symptoms, and laws, that are in some instances slightly variable but nevertheless well established.

My observations lead me to believe that the poison of malaria exerts a causative agency as regards the production of disease of the kidneys. It has occurred to me to notice that in a region abounding in malaria there are a greater number of cases of affections of these organs, than in localities where there is little or no malaria. My experience in this city, has been, that in the majority of cases of different affections which I have been called upon to



attend during the past year, I have found upon examination more or less albumen in the urine ; this has been especially marked in cases of office practice. In order that malaria may be involved in the causation of chronic albuminuria, does not necessarily imply an antecedent attack of intermittent fever. This may be shown by the fact that chronic albuminuria is more numerous in marshy, wet climates where malaria is known to abound ; the chronic albuminuria taking the place of, or being conservative as regards the manifestation of intermittent fever. Malaria by paralyzing the vaso-motor nerves of the kidneys, interferes with the functions of these organs, said interference extending to their circulation, producing congestion, which in course of time becomes chronic, resulting in chronic albuminuria. The absence of intermittent fever as an antecedent affection to chronic albuminuria, does not prove that the individual was not a victim to the poison of malaria, or that the latter does not stand in a causative relation to the albuminuria. The manifestations of the evil effects of the poison of malaria are multitudinous.

This poison, as a general rule, cannot rise in any power over forty feet perpendicular ; neither can it cross a body of water of any magnitude. It is also harmless during the day. It begins its mission after sunset. It has no odor, nor color, nor anything that addresses our senses ; but we know when and where to look for it ; we know how to guard against its action ; we know its effects and the manner of their appearance. We are fully acquainted with the laws of its being and we are so intimate with these laws that we can exercise great control over the evils incident to the poison. There is nothing in all the etiology of diseases with which we are as well acquainted as we are with malaria.

Every disease of which we know anything, has a distinctive mark by which it is positively known. There have been occasional examples of human beings who resembled one another so perfectly that a casual observer might confound them ; but there were always experts who were able to distinguish the one from the other. This confusion of resemblance has often baffled physicians as regards the discrimination of remittent and yellow fever. This cannot be wondered at when we take into consideration that they are identical and differ only in intensity. Having personally experienced an attack

of yellow fever at New Orleans, in 1871, and having an opportunity to observe the clinical history of this disease during the following winter at Key West, Havana and Vera Cruz, as well as having assiduously studied the clinical history of many cases of pernicious remittent fever since then, I am very firm in my belief that they are as regards their etiology and pathology, precisely the same, differing only in severity. Intermittent and remittent fever are developed before yellow fever can make its appearance, the latter requiring for its production a mean daily solar temperature for two months or more, of seventy-five degrees, acting on moist vegetable material.

There is not, in the entire science of medicine, a more interesting and instructive study than that of intermittent fever in its multitudinous phases. It may come in a deadly form in its first paroxysm, or it may attack persistently for many months, always impairing health, but not endangering life, as regards immediate results.

But no matter in what form malaria may manifest itself, it has, even in its most irregular forms, certain features by which we can distinguish it. The periodical fevers wear the mark of every species of disease; but there is always one infallible sign present—that is found in the urine,—and it is pathognomonic. These fevers are subjects of a peculiar and expressive law; the poison that produces them has a property called latency, by which it may lie in the system for a long time, some multiple of seven, and it may then develop itself in a climate where such diseases never originate. Or, it may remain latent all winter in this climate and then manifest itself in the spring, before the cause is again developed. A poison possessing such potency as this, that conceals itself until its time for action comes, and then leaps into destructive power, deserves the deepest and most careful study of medical men. Much has been said and written about the cause of periodical fevers, but we must have facts upon which to establish our teachings. Otherwise we may be put as far from the truth as the executioners of witches were from mercy and justice. I offer no theories; but I offer that which I earnestly believe to be facts, feeling that our knowledge of these diseases will be best advanced by a careful and conscientious record of demonstrable facts instead of vagaries and theoretical hypotheses.

The most amiable and kindly of our medical men no sooner engage in a discussion connected with the origin, cause or treatment of diseases, then they become possessed with the demon of intolerance, and seem to be unwilling to allow an opponent of their views any virtue whatever, and do not hesitate to impugn their personal integrity. It is with extreme diffidence, then, that the writer ventures a little way into the surf of the sea of medicine. Having no views sufficiently monstrous to excite anyone's wrath, he ventures a few thoughts, as well as suggestions, in connection with his reasons for the "faith that is in him."

People may wonder how it is possible that there can be two opinions upon a subject of this character. Men do not all see with the same eyes, or hear with the same ears, or feel with the same touch in the study of any subject. Ministers of medicine do not differ among themselves one whit more than do the ministers of religion among themselves, or the ministers of law among themselves. In the present imperfect state of human knowledge as regards the principles and practice of medicine, we should test all theories in the crucible of clinical observation.

It is to Prof. Baccelli, of the University of Rome, that we owe much of our present knowledge of the nature and influence of malaria. When we realize how malaria, in its worst forms, rages in the Northern and Southern States of America; that the records of the medical literature of our late civil war demonstrate that there occurred in the army not less than 1,500,000 cases of malarial fever, and more than 50,000 deaths resulting therefrom, we must be admonished by these startling facts that the study of malarial diseases, as regards their origin, their nature and their treatment, should be considered a duty of the utmost importance.

Heat and moisture alone will not generate malaria: they serve only to modify the poison, to facilitate and develop its action; whether by imparting to it greater activity by increasing the dose of the poisonous principle, or by disposing the system to the more easy reception of its influence. These alone cannot determine intermittent, remittent or yellow fever. The action of a specific albuminoid principle, the product of the fermentation of decayed vegetable matter, appears to be essential towards its production, and this albuminoid element after its entrance into the human organization—not in the form of a germ; but as a malarial gas, is



productive of a morbid condition pertaining to the nervous system. Malaria is an element derived from marsh infection existing under a gaseous form and exclusively of telluric origin; an emanation evolving a gas which exerts a morbid influence on those who are exposed to its action. This toxical element in the atmosphere, when absorbed in the human body, is productive of a morbid condition of the blood, and at certain regular intervals of time of intermittence, it will explode, discharge, and finally exhaust itself until a fresh charge is generated by causes either from without or from within the body, and not attended by constant phenomena as may be observed in typhoid or general fevers.

Malaria is not so active in temperate as in hot climates, where vegetation undergoes rapid decomposition, thus producing a greater quantity of this poisonous albuminoid element. Wherever there is a conjunction of heat, moisture and decomposed vegetable matter, there will malaria exist. It may not be as marked in some places as in others, but it is none the less ubiquitous. In one locality it will manifest itself in yellow fever; in another, in intermittent fever; in another, in remittent fever; in another, in a mild type of fever, and in another, in neuralgia or a general feeling of malaise.

Among the numerous manifestations of the pathological effects of the poison of malaria in its earlier stages are languor, mental anxiety, impaired memory, physical debility and indigestion. These morbid conditions in their character have a tendency to greatly debilitate the system and thus be productive of a confirmed affection of either the liver, spleen, stomach, or kidneys, or it may be, and not infrequently is, of all of these organs.

Prof. Baccelli contends that whatever inclines, like the poison of malaria, to impair the function or the texture of the spleen—an organ which, as a part of the lymphatic apparatus, acts so important a part in the formation of the blood and in the process of nutrition—must affect greatly the function of digestion. Clinical observation confirms this. And that to nerve paralysis, through the action of this poison, must be attributed, not alone the phenomena manifested during a paroxysm; but also the sequel of intermittent fever. When we reflect upon the intimate relationship existing between the special venous circulation of the spleen, pancreas, stomach and liver, in conjunction with the peculiar function of the spleen, destined to supply to the glands of the stomach the materials necessa-

ry for their secretion ; we can readily arrive at a lucid comprehension of the effects of the nervous, morbid condition brought about as a result of the interference of malaria. This poison acts upon the ganglionic nervous system, and on the blood corpuscles, causing vaso-motor irritation, followed by vaso-motor paralysis, paralyzing that system of nerves that regulates and controls the arteries and the circulation of the blood, creating a condition of hyperemia and congestion of the spleen and liver, unlike that resulting from inflammation. The poison of malaria alters the character of the blood, producing congestion of the spleen, which, by reason of its relation with the digestive organs, partakes of their intermittent action and thus establishes a fever of an intermittent type. The poisoned condition of the blood is the primary cause of the engorgement of the spleen. Authors, ancient as well as modern, have observed that quotidian fevers are most frequent in summer in hot climates, because the congestion of the spleen is greatest and malaria more abundant. Tertian fevers are more frequent in autumn and quartan in winter. Quotidian comes on before noon, tertian in the afternoon and quartan at night.

The tertian type is the one most frequently met with, and the quartan the most severe and dangerous. The quotidian type of intermittent fever more readily changes into a remittent, or some form of continued fever. In cases of quartan, we generally find the longest stage of chill, and in the tertian form the longest stage of febrile excitement. My observations as regards these characteristic peculiarities of the periodical fevers, coincides with the experience of Prof. T. J. Dills, of the Medical College, of Fort Wayne, Ind.

It is not easy to understand how the nerves that supply the spleen should be specially affected by malaria ; yet, it is not more difficult of comprehension than how, by an abnormal development of nervous force which manifests itself in the epileptic paroxysm, gets rid of the disturbance by an attack of epilepsy. The agency producing this condition, is supposed to be seated at the center of the cerebro-spinal nervous system, rendering this a neurotic functional affection ; but, our present knowledge of the functions of the nervous system, warrants only conjecture with respect to the morbid perversions which constitute the neurotic affections. But we can understand

how the spleen should be specially affected by malaria, when we take into consideration its peculiar spongy, elastic and erectile tissue, and why it should be better disposed than any other organ to receive the current of blood driven back to the internal organs during the cold or congestive stage of fever. Among the many opinions respecting the effects of malaria on the human organization, that appears to be most consonant with modern theory and clinical observation which asserts that the toxical element of malaria produces spasm of the muscular fibres. This spasm can only be produced by irritation of the vaso-motor nerves, and followed by paralysis; this nerve action being consequent upon the introduction into the body of the poison of malaria through the agency of the blood. We are therefore justified in concluding that a paroxysmal febrile disturbance of an essentially intermittent type, is generated in the human body when exposed to the malaria emanating under certain conditions from the earth, these conditions being the combined influences of heat, moisture and vegetable decomposition.—And that this toxical element, once absorbed into the human body, thoroughly disturbs and paralyzes the system of nerves which regulates the circulation of the blood, modifies the composition of that element, produces disorders of calorification and congestion to internal organs; the most constant being that of the spleen.

The spleen is the organ which suffers most frequently from the influence of the poison of malaria. It is an organ void of ducts, not intended for secretion; but, as a reservoir in over-repletion of the portal circulation, and for the elaboration and assimilation of germ cells, the materials of which are derived from the blood, must necessarily suffer in an especial manner from the effects of a poison like malaria, which exerts a tendency to be productive of a decomposition of the blood, from which it derieves the materials necessary for the performance of its functions. Under the influence of malaria, the spleen will pass from a slight hyperæmia to a permanent condition of hypertrophy—known among the older writers as “ague cake,”—or to alteration of the texture, degeneration and atrophy. If the body be not subject to the continued effects of malaria, the enlargement of the spleen may spontaneously disappear. But if the action be uninterrupted, as in marsh cachexia, the swelling of the spleen will be constant. The alternating sensations of heat and



cold, the livid hue of the skin, and the exudations of serum, afford evidence of cerebro-spinal and pulmonary anemia. In our investigations into the nature and origin of this poison, we must be guided by demonstrable facts, founded upon what we know with certainty of its effects on the human organism, not allowing ourselves to be carried away by theories, no matter how fascinating or plausible they may appear.

The nerves supplying the spleen, stomach, liver, and kidneys, being subject to the long irritation as a result of the poison of malaria, produces an exhausted condition of the nerve centers of this part of the ganglionic nervous system, and hence the vaso-motor nerves proceeding from these centers are partially paralyzed, and the arteries controlled by them are relaxed, and allowed to transport an excess of blood to the organs above adverted to, thus producing an engorged, or hyperæmic condition of these viscera. As a result of the influence of the poison of malaria upon the human organization, we find the yellow tinging, or saffron coloring of the skin. We know that jaundice can be produced by derangements of the nervous system, by mental emotions, fright, etc. These derangements of the nervous functions are connected with the liver, either by interrupting the circulation of the blood through the liver resulting from spasm of the bile ducts, or by interfering with the action of the heart and kidneys. These facts are mentioned in confirmation of my belief in the paralysis of the vaso-motor nerves as a consequence of the effects of the toxical element of marsh miasm.

Whatever will exert a tendency towards a relaxation of the partially paralyzed ganglionic nervous system resulting from malaria, will demonstrate to be possessed of therapeutical properties in intermittent fever. It will be found that a person who has once been affected with the poison of malaria is liable to a return of the affection upon great nervous disturbance, from whatever cause arising. Also that a great number of persons residing in malarious countries are not seriously affected by this poison, owing to their living tranquil and carefully guarded lives, but who immediately suffer from the effects of malaria manifesting itself, as a result of harassing emotions, or anything which has a tendency to agitate the nervous system.

It has not infrequently occurred to me, to observe, that the labor pains of child-birth have been productive of an attack of intermittent fever; generally of a severe type, in women, who prior to confinement had developed no manifestations of the effects of malaria, the accouchment being an exciting cause, acting as a shock, or disturbance of the nervous system.

Whatever cause may tend to impair the texture of the spleen, will interfere with its peculiar function, destined to supply to the pepsin glands the materials required for their secretion. The spleen, being involved in the morbid condition of malarial fever, so is dyspepsia and other gastric affections most pronounced, when, by the incessant and persistent influence of malaria, the normal condition of the spleen becomes affected as regards its function of responding to the solicitations of the glands of the stomach; and in the changes which it undergoes by this action, consists some of the essential characters of intermittent fever. The reaction of the system, as manifested by the paralysis of the vaso-motor nerves, subsequent to their irritation, against the poisonous effects of malaria, generates a periodical non-inflammatory morbid process, the leading character of which is intermittence.

The different types of intermittent, remittent and yellow fever, depend upon an absorption of the same malarial poison; but in different proportions. The malarial emanation has at certain times a more virulent character, and thus is productive of a more malignant type of disease, resulting in a greater mortality. That which in Northern Indiana would be correctly diagnosticated as a case of pernicious remittent fever, would, if it occurred at Memphis, Tenn., be rightly considered a case of yellow fever. These fevers are always the result of infection, not of contagion; although they are frequently associated with contagious diseases. The emanations of decomposed animal matter will not generate malarial fever. There are many causes which will debilitate the system; yet they are incapable of determining these fevers; but they may dispose the body to them when it has been exposed to malaria. The action of malaria within the same circumscribed territorial limits, varies with the individual exposed to its influence; and this difference of action depends on its intensity, the constitution of the individual and upon that condition of body created by past disease, or the predisposition

to future disease. When the poison of malaria exists in the human body in a latent form, it will excite and complicate any disease to which the body, from some peculiar temperament—be it nervous or sanguineous—may be disposed. It becomes a source of great danger when complicated with some local affection of an organ essential to life, as of the liver, lungs, heart, kidneys, etc. This latent malaria then becomes a distinct affection, producing a compound of a local and general disease, which mutually react and aggravate each other. But to return to the action of the poison of malaria upon the spleen, the primary cause of the congestion of which is the poisoned condition of the blood, and that the intermittence of the periodical fevers is due to the intermittent function of that organ. The study of the gastro-splenic circulation will enable us to understand how the poison of malaria by affecting the spleen must give rise to the various forms of intermittent fever and their accompanying symptoms. That peculiar venous circulation which is restricted to the spleen, stomach, pancreas and liver, is calculated to fix in these organs all the hydrocarbonized materials required for their respective functions; just as the small thoracic circulation seems to eliminate certain chemical products, and fix the oxygen for the purification of the blood. The effects of malaria upon this circulation being of such a disastrous nature as to be productive of paralysis of the nerves controlling it, the result could not be other than that which we find by clinical observation in all cases of malarial fevers, whether they partake of such a character as to be pronounced and well marked, or obscure and masked.

The action of malaria upon a particular system of nerves, is similar in its results to that which would be produced by their division. For instance, if we divide a branch of the great sympathetic going to any especial part of the body, we produce paralysis of the part, and the part supplied by that particular branch of the nerve becomes hot, swollen and congested and subject to serious exudations, not as the result of an inflammatory action, but as the result of the loss of the controlling power of the vaso-motor nerves over the arteries. Virchow states that when the splenic plexus of the great sympathetic had been divided, there resulted great hyperæmia and degeneration of tissue. These consequences may therefore be regarded as the indication of a morbid nervous influence.



Great elevation of temperature of the body is discovered by the thermometer during the cold stage of periodical fevers, while that of the periphery is lowered from a contraction of the capillary arteries through primary nerve irritation and a diminution in the tissue metamorphosis. By the relaxation of the capillary vessels, heat is given off during the sweating stage, and the body temperature cools down. Rise of temperature, of itself, does not constitute fever. It is only one of the factors entering into the composition of this pathological condition; and there will be found other very important morbid processes, independent of rise of temperature, essential to the production of fever. The probabilities are, that fever is a result of a disorder of the function of certain parts of the central nervous system, and is a vaso-motor phenomenon, which conduces on the one hand to the giving off of a greater quantity of heat by an influence on the capillary vessels, and on the other hand, to an increase in the production of heat by an influence on the circulation in the internal organs, spleen, liver, stomach, kidneys, etc.

As we have already stated, the peculiar venous circulation and functions of the spleen, renders it liable to be seriously affected by the poison of malaria, and thus interfere materially with the digestive function of the stomach. The spleen, with its attendant short veins, is to the cells of the pepsin glands, what the system of the vena porta is to the cells of the hepatic glands. The larger curvature of the stomach is connected to the spleen by five or six straight venous canals; these anastomosing by means of minute veins, disposed vertically and obliquely behind them. The absence of valves and of any coercive contrivance, enables the blood to move on in a double inverse current, and to halt at a given moment, either in the stomach, the spleen, or the intermediate vascular system. The veins which pass from the spleen to the stomach, penetrate deeply. All of this gastro-splenic circle opens into an angle formed by the splenic and left coronary vein. The pepsin glands abound in that part of the stomach towards which these veins converge, and appear to be connected exclusively with the venous system. Such being the case, we can readily understand how the various affections of the spleen give rise to the various forms of gastric trouble which we find in intermittent fever.

Tenderness over the epigastrium more or less marked, loss of appetite, indigestion, feeling of nausea and desire to vomit, are the

results of some chemical alteration in the stomach, due to a perversion of the gastro-splenic circulation, thus preventing the normal production of pepsine, both as regards quantity and quality, by depriving it of carbon, which enters largely into its composition.—Starting from the spleen, we can trace a circle of venous circulation which we may divide into an anterior section connecting the stomach, spleen and liver. This abdominal circulation is in accordance with the laws of anatomy, physiology and chemistry, the function of which appears to be to utilize the hydrocarbon materials for the production of pepsin in the stomach.

It will readily be seen from the foregoing description of the action of the poison of malaria upon the spleen, how the stomach and liver become involved, sooner or later, in the pathological condition frequently resulting in an obstinate dyspepsia, or icterus, as concomitants of ague and periodical fevers.

Whenever the spleen is affected from any cause to such an extent as to be productive of a morbid or pathological condition of that organ for any length of time, there is a tendency to hemorrhage. A pathological condition of the spleen necessarily implies leucocythemia and the tendency to bleeding in this affection is very pregnant. I consider this a potent reason why splenectomy should never be performed in malarious countries. It is my opinion that even in simple enlargement of the spleen as occurs after intermittent fever, the operation of splenotomy is unjustifiable, owing to this strong tendency to hemorrhage. This hemorrhagic tendency depends on the actual condition of the blood, but may not manifest itself until an abscess, or wound provides the opportunity essential for its manifestation. This inclination to hemorrhage may exhibit itself in frequent epistaxis, or from the surface of the body, or into the internal organs. In affections of the spleen, surgical operations, even of the most trivial character, are to be avoided as far as possible owing to the great danger of producing uncontrollable hemorrhage. Splenohæmia is the invariable result of the entrance into the system of the poison of malaria.

Various poisons exert different influences upon the nervous system. Some poisons will act on the nerves, and through them on the muscular fibres. Others will be productive of nerve-irritation and muscular spasm, and if this be not relieved by relaxation or

nerve paralysis; but, be it not long continued, death will result from spasm and suffocation. Other poisons may cause death as the result of exhaustion resulting from immediate nerve paralysis. But the nerve irritation and subsequent nerve paralysis which is productive of intermittent fever, has its etiology in the poison of malaria.

The chill is the manifestation of the action of the poison of malaria upon the ganglionic nerve centers presiding over the functions of special organs and is a stimulus provided by nature endeavoring by this effort to rouse the partially paralyzed and dormant nerves and enable them to overcome the deleterious results of the poison of malaria.

I do not believe that frost destroys the poison of malaria. It only metamorphoses it from a positive into a latent condition. The solar heat of summer reverses the order of this metamorphosis, in addition to creating new supplies of malaria.

The only difference as regards intermittent fever and yellow fever, is in the effects of solar temperature. This conspicuous element is absolutely indispensable in the production of the latter affection. Vegetable material in a decomposed state, and moisture are not sufficient to produce these diseases. These two factors may be very abundant where the requisite solar temperature for yellow fever or intermittent fever cannot travel, and therefore they will not exist. Yellow fever is very rarely if ever seen beyond  $45^{\circ}$  north latitude and  $25^{\circ}$  south latitude. The presence of a daily mean solar temperature of  $75^{\circ}$  for two months at a time, in connection with moisture and vegetable decomposition, is essential to the production of yellow fever. Where the daily mean temperature ranges from  $60^{\circ}$  to  $70^{\circ}$  and we have the other two elements referred to as necessary, we will find intermittent and remittent fever. The zones which are most conspicuous for yellow fever, are Tampico, Mexico, on the west, Barbadoes, on the east, Rio Janiero, on the south, and Charleston, S. C., on the north. The disease is perpetually present at some point within the above territorial limit. In 1836, Tampico failed to have her usual periodical rains at the accustomed time. Her soil was full of vegetable material and her temperature very high; but moisture was absent and for the first time in her history there was no yellow fever in June or July. During the following September the rain fell abundantly, with a high solar temperature and vegetable material fit for de-



composition, and for the first time in her history she had an epidemic of yellow fever in the autumn. We will give another example in which the requisite solar temperature is absent. St. Petersburg in Russia, has long been noted for her violent and fatal epidemics of intermittent fevers; but there are years in which she is entirely free from them. These are years in which her daily mean temperature is not greater than  $59^{\circ}$ , the absence of one degree of the daily mean temperature is a prophylactic of intermittent fever.

Moscow, in Russia, has occasionally been subject to oriental plague, intermittent, remittent and yellow fever. Yet no case of these diseases has ever been seen within the Kremlin, large and populous as it is. Why? Because a wall sixty feet high surrounds the Kremlin. The cause of these disease has never climbed over the wall of the Kremlin. The Moskwa river runs along the base of this wall and in other portions of the city the people are subject to annual visitations of "fever and ague." The great Hennen, in his Medical Topography of the Mediteranean, makes the statement that plague does not climb up stairs. The facts would hardly warrant the conclusion of the "germ" theory of the etiology of these diseases. Germs, being living organisms, would have the power to reach an altitude greater than sixty feet; and thus prevent confinement within certain circumscribed territorial limits.

The liver, the largest gland in the body, in a normal condition excretes from the blood about two and one-half pounds of bile daily, and this, being an excrementitious product, should be eliminated from the system. But the liver, being effected with paralysis of its vaso-motor system of nerves, as the inevitable consequence of the poison of malaria, is incapacitated to such an extent as to be unable to eliminate from the blood the broken down tissue and waste material which it should transform into bile. This poisonous material, being retained in the circulation, soon manifests its deleterious effects in all parts of the organization, by such symptoms as a rapid pulse, coated tongue, thirst for acids, lassitude, depression of spirits, loss of appetite, pain in back, headache, etc. The liver by its continued efforts at getting rid of these excrementitious elements and its inability to do so, not infrequently, sooner or later, leads to an enlargement of that organ; thus compelling it to encroach upon

the diaphragm, which, in turn is necessitated to intrude upon the locality occupied by the right lung, forcing it up, and materially interfering with its functions of inspiration and respiration, to such an extent as to be productive of a cough which may simulate that of pulmonary tuberculosis.

We can add to the numerous pathological conditions already given as being the consequences of the toxicohæmia resulting from malaria those of an irritable disposition, sallow complexion, loss of nervous power, and eczematoses. And while the prognosis in cases of intermittent fever, is generally favorably, as regards life, yet, long protracted intermittents have a tendency to induce visceral obstruction and engorgement which may manifest itself in dropsy, or a malarial form of Bright's disease, an albuminuria characteristic of the continued effects of the poison of malaria upon the kidneys.

It will thus be seen that in a region of malaria, there are few diseases which are not either the direct or indirect result of the virulence of this miasmatic poison, or which are not intensified by its paralyzing action.

If we may be permitted to use an illustrative phrase, we would say that the liver is the great balance wheel which controls and regulates the principal functions of the human organization; and whose healthy and harmonious action depends upon the normal condition of this gland. This normal condition being so disastrously affected by the presence of malaria, the result cannot be otherwise than deleterious to the individual. The liver, as an organ and in its functions, is unlike the spleen, and does not agree, either in its anatomy or physiology with any other gland of the body of which we have any knowledge. Consequently, it would be differently affected, as regards the symptoms manifested in the individual by the action of the toxic properties contained in malaria. The nervous system of the liver is at the present time shrouded in considerable obscurity, owing, perhaps, to the field of the physiological action of the nervous system upon the secretion of bile not having as yet received that attention which its importance demands. But, judging from the known effects of paludal malaria upon the spleen, we are led to infer that the pathological condition conventionally called a "torpid liver," is technically a paralysis of the vaso-motor

system of nerves of the hepatic organ ; as a result of the interference of the poison of malaria, and to a certain extent rendering it unable to properly perform the functions of separating from the blood certain excrementitious matter which is essential to the production of bile.

The liver being unable to perform its normal physiological functions as a consequence of the partial paralysis of its ganglionic nervous system, proceeding from the effects of malaria, is productive of a morbid condition of the blood, and its consequent retardation at this part of the vascular system, and an interference with the transformation of materials taken from the blood, by this organ, which should undergo a retrograde metamorphosis. The liver, lungs, and heart may not inappropriately be considered as constituting the tripod of life. The poison of malaria being productive of a disturbance in the functions of the liver ; from abnormalities in the secretions, or in the excretion of bile, which is manifested in the yellow tinging of the skin, and is indicative of a derangement in the physiological duties of that organ, may not be developed until some time after the inhalation of the toxical element of malaria, owing to the sluggishness of the sympathetic nervous system to respond to impressions made upon it. The yellow tinging of the skin above adverted to must not be confounded with the jaundice of pyæmia, narcotism of chloroform, fright, etc.

The great Murchison classifies the functional derangements of the liver and their consequences, as follows :

1. *Abnormal Nutrition* ; An abnormal deposition of fat. This condition is the opposite of that of emaciation.
2. *Abnormal Elimination* ; Retention of cholesterine, etc.
3. *Abnormal Disintegration* ; Imperfect disintegration of albuminous matter, or its non-conversion into a soluble product (urea), which can be readily excreted by the kidneys.
4. *Derangements of the Organs of Digestion* ; Deficient or abnormal appetite, flatulence, constipation, etc.
5. *Derangement of the Nervous System* ; Such as pain in the limbs, in the liver, headache, vertigo, convulsions, paralysis, depression of spirits and irritability of temper.



6. *Derangement of the Organs of Circulation* ; Producing palpitations, irregularities and intermissions of the pulse, angina pectoris, etc.

7. *Derangement of the Organs of Respiration* ; Chronic bronchitis, spasmodic asthma, and catarrh of the fauces.

8. *Derangement of the Urinary Organs* ; Deposit of lithic acid, lithates in the urine, renal calculi, diseases of the kidneys, inflammation of the bladder.

9. *Abnormal Condition of Skin.*

All of the affections above adverted to may be the effects of the poison of malaria acting upon the liver. These diseases are termed functional, which, to say the least of, I consider an unfortunate term. I believe that the action of marsh malaria, if long continued upon the liver, has a tendency to be productive of organic lesions of that organ ; such as circumscribed suppurative inflammation, cirrhosis of the liver, hydatid tumors of the liver, multiple abscesses of the liver, resulting from inflammation of the veins of the portal system leading to the production of pus and hypertrophy of the liver.

According to the census of the United States, taken in 1870, malarial fevers are most fatal ; first, in Florida, Louisiana and Texas ; second, in Arkansas, Mississippi, Alabama, Georgia, Missouri, Kansas and Nevada ; third, in New Mexico, the Carolinas, Virginia, Tennessee, Kentucky, Illinois and Indiana ; fourth, in New England, the Middle States, Wisconsin and Minnesota. While the use of impure or marsh drinking water seems to have some effect in promoting malarial diseases, it gains access to the system mainly through the respiratory organs.

## THE GENERAL TREATMENT OF MALARIA.

Diseases should be treated with reference to their cause and with reference to their locality. Malaria is the most abundant source of chronic and is often the source of acute disease.

The ancients aptly typified in their awful, the many headed hydra, the multitudinous manifestations and phases under which the poison of malaria developed itself. These diseases are now preventable and curable to an almost unlimited extent. Formerly it scourged the face of the earth by sweeping off thousand of its victims every year. It did its deadly work irrespective of society, personage, or rank. More than one royal personage perished from the effect of this poison, and the great Cromwell fell a victim to its deadly influence. A large proportion of the abnormal conditions of the various organs of the body affected by the poison of malaria, give rise to no immediate marked derangements of their functions, obvious to the eye of the physician ; but, it produces alterations in the animal economy nevertheless, which declare themselves in a prominent manner after they have reached a certain stage.

A whole series of empirical remedies, which have been tried by various experiments, have been recommended in the treatment of these fevers. Most of these remedies owe their importance to the relation in which they stand to the cause. Hence, in the choice of these remedies we can only be guided by the pathology of the affection.

Prof. Klebs and Tommasi-Crudelli, advocates of the germ theory of the periodical fevers, state that quinia, when swallowed, will be absorbed like the germs themselves, and by preventing their multiplication, or actually destroying them, will tend to prevent their getting into the general circulation and their producing disease.—The calamitous results from bacteria getting into the circulation, may be conceived, when we state that a single drop of fluid, containing the bacteria of *milz brand*, introduced into the blood of the largest ox, multiplies its poison to such almost incredible degree as to cause death in twenty-four hours.

The above theory of the action of quinia will not stand a test ; for in places where quinia is unknown, or cannot be obtained, as in

Morocco, "ague" is cured by remedies which could not have any direct action upon such spores, if they exist.

The late distinguished Priory, having observed that neuralgia was frequently of an intermittent character, and how readily it yielded to the administration of quinia, concluded that the origin of all intermittent fevers, or results of the poison of malaria, existed in the nervous system, especially that portion which corresponds to the spleen, and that quinia had a tendency to exert a direct influence on the ganglionic nervous system. It is stated that quinine acts upon the vaso-motor nerves and spleen in health, apparently, as the heat of a fire does when the burnt finger is put close to it.— In both of these cases, the paralysis of the vaso-motor nerves is overcome, the circulation restored and the consequent pressure of the congested veins upon the nerves removed.

The different modes and combinations in the administration of quinia will depend materially upon the material complications as regards its capability of counteracting the paralyzed condition of the nervous system above adverted to. In the treatment of a disease which manifests itself under forms so varied and so treacherous, much will depend upon the judgment and experience of the physician.

It has been demonstrated that quinia acts in malarial diseases as a stimulant or sedative to the nervous system; especially that portion of this system most implicated in these diseases, and that it is principally in virtue of this action that it is considered a specific, by rendering the poison inoperative, by an antagonistic action upon the nervous system, and that it proves beneficial in proportion to the absence of complications.

The advocates of the *germ theory* of the periodical fevers, assert that because the physiological action of quinia is opposed to putrefaction and fermentation, and exerts a fatal influence on infusorial life, demonstrates the correctness of their theory as regards the cause of intermittent fever. But this argument will not hold good when it is known that the action of quinia is as great to prevent and retard chemical and nutritive changes, and also to overcome the paralysis of the vaso-motor nerves. An illustration of this magical action of quinia upon the palsied nerves, is given in subcutaneous injections of quinia in case of sun-stroke. Of course it would not



follow that after the nerves had lost almost all control over their organs, quinia would have the action, nor in cases of enlarged spleen, liver, etc., where true hypertrophy has taken place.

And with a drug whose action and influence is so varied, and so utterly unlike that of any other, our appreciation of the manner of its effects will not as yet warrant us in attempting to more than define its powers in accord with our respective reasoning capabilities, corroborated by evidence gathered from the field of experience and based upon clinical observation. I am convinced that quinia is used too extensively and indiscriminately in this country in the treatment of the periodical fevers, and for the real or fancied effects of malaria. It should be borne in mind that quinia may be productive of evil as well as good results. While it is impossible to estimate the great blessing conferred upon the human family by the discovery of quinine, there are good reasons for suspecting that, like venesection, catharsis, and other therapeutic agents in vogue at various epochs, it has often been employed without a due regard to proper limitations. Its lavish and excessive use in all diseases recognized to be of malarious origin, and under all contingencies, cannot always be judicious. Briquet states that the salts of quinia, in doses sufficient to induce a sedative impression upon the circulation, produces in the economy so serious a perturbation that the risk ought not to be run, except when the disease is serious, either from its duration, its gravity, or the accidents and danger to which it may expose the patient.

That quinia is a specific in malarious diseases, is a phrase calculated to conceal our ignorance of the mode of cure. Even its power as a prophylactic, when fairly tested, has proven unsatisfactory, and fallen below expectation, and evidently it is overestimated as regards its tonic properties. Often, when taken in anticipation of a paroxysm, it has not only failed to avert the attack; but has been productive of very undesirable gastric and cerebral troubles.

Although we may have experienced desirable results from a bold and unshrinking use of quinia in malarial diseases; there is no valid reason why we should be reckless in the doses we employ. This remark reminds me of the assertion of Hahneman.—“That bark can produce intermittent fever.” A great many persons who have been seriously affected with malarial fever and have experi-

enced the benefits of quinia; cultivated the habit of taking it upon the slightest indication of illness, and in quantities which are often extravagant. This cannot be done with impunity; it throws the nervous system into a state of great commotion. While quinia may be unable to produce "ague" in a person never subjected to the malarial poison, its untimely and improper use by a person formerly "aguish," will certainly reproduce the paroxysm with greater or less severity. I have not infrequently personally experienced this fact. The special action of quinia upon the nervous system, can be deduced, from the fact, that when excessive quantities are taken, it is productive of loud ringing noises in the ears, cephalalgia, vertigo, amaurosis, and delirium. In animals of a lower order a fatal dose of quinia has produced convulsions and paralysis of the posterior portion of the body. In some instances it manifests a poisonous property, in a disagreeable action on the skin, by irritation and desquamation. It has also been known to accelerate the action of the heart and increase the frequency of the respirations. Quinia exercise a restraining influence on the production and circulation of the white corpuscles of the blood.

Prof. Austin Flint, Sr., by far the ablest medical writer in America, is very conservative in his writings as regards the reckless and indiscriminate use of quinia, he cautions, and suggests the judicious and prudent use, and administration of the various preparations of the bark.

Arsenic is another remedy often used in malarious diseases, and frequently with the happiest results; and has proved very effective in removing the moth-spots which we frequently see following affections of the liver. Whatever its beneficial results are, they are the consequence of its action first upon the liver.

Iodide of potassium we would add to this list of powerful remedial agents in malarial affections resulting in splenic or hepatic congestion and obstruction.

Dr. A. G. Tebault says that no other agent which he has ever employed, superseded *carbolic acid* as a disinfector of the malarious taint within the system; and this after anxious thought upon the subject for years, and is, to his mind, the first glimmer of light that may lead to the discovery of a remedy to act directly on the poison of malaria. He adds that in experiments instituted during the past seven years, feelings of lassitude, malaise, disturbed sleep, nauseous taste, anorexia and nervousness gave way under this treatment within a few days, sometimes within twenty-four hours.

Dr. J. Nodwodnitschanski, of St. Petersburg, speaks in glowing terms of the efficacy of iodine as a therapeutical remedy in the treatment of malarious affections. He says that for a long time he has employed iodine in spirituous solution for "fever and ague," and has obtained very favorable results. He believes that iodine will not rank second to any known drug in the treatment of intermittent fever.

Dr. R. F. Hood, of New Orleans, has great confidence in the therapeutical properties of the bark of the *fagus castanea*, as an anti-periodic. He says that it will afford more permanent relief than either quinia or arsenic.

Dr. Hartwig Bunz, of Savannah, says that salicylic acid is the most powerful antipyretic against intermittent, remittent and yellow fevers. He says that the excellent results can be judged from the fact that out of a total of one hundred and seventy-nine patients of both sexes, and of all ages, treated by salicylic acid for the above diseases, only four died!

Prof. L. P. Yandel, M. D., of the University of Louisville, proposes the use of strychnia in malarial affections. He says that it is quite equal, if not superior to quinia as an anti-periodic. In a number of cases in which he employed this drug, a few days sufficed to bring about great amelioration as regards the gastric and intestinal difficulties.

Dr. H. Osgood, of Philadelphia, highly extols the virtues of inhalations of the nitrite of amyl in cases of intermittent fever. He states that it will certainly prevent or abort the chill.

Dr. Jackson, in the U. S. Dispensary, suggests the use of spider web in cases of chronic intermittent fever. Dr. L. M. Jones reports having cured a case with this remedy, after quinia, camphor, arsenic, eucalyptus, iodine and phosphoric acid had failed. He states that neither the patient nor her friends knew the nature of the remedy used, so imagination had no part in the cure.

The Turks have great confidence in the curative power of the chloride of sodium in malarial diseases. In my experience, it has fallen short of my expectations as regards its therapeutic value.

The rational indications of treatment are:

1. To diminish the violence of the paroxysm; and,
2. To prevent a repetition of it. The latter object is the more important, and the period of apyrexia is the time to accomplish



this desirable indication. It follows from what we have said that the natural indication is to restore the normal vital energy of the nerve centers of the organs affected--liver, stomach, and spleen. As soon as this irritation of the nerve centers is relieved, and the vaso-motor restraint again contracted the constitutional disturbance will disappear.

The physician who treats all diseases resulting from the effects of the poison of malaria by the same set formula, is not a rational physician ; but is a mechanical doctor. He has transferred the practice of medicine from the domain of reason to that of mechanics. In order to be successful in the treatment of diseases, he must understand their cause and their seat, After having ascertained the character and location of the affection, he should be prepared to bring to bear established rules of practice upon the pathological conditions manifested. The practice of medicine, to be successful must be based upon the possession of the capacity and ability above implied. Theory is of little avail and practice deduced from theory cannot but prove a disappointment and very undesirable. One FACT is of infinitely more value than a thousand of the most beautiful theories ever constructed, especially when the possession and application of that fact may exert a tendency to be productive of a prolongation of life or alleviating physical suffering.

If this little treatise should prove to be a solemn funeral of my literary remains, I desire it to be understood that I die in charity, without complaining against the supposed justice of the present generation, or any sycophantic appeals to posterity. I shall quietly submit to every truth which time may demonstrate to the prejudice of any assertion contained in this brochure. Should it receive an unfavorable criticism at the hands of some medical Thesaurus, I shall not attempt to vindicate it in print, believing that if it is true it will vindicate itself and if it is erroneous it cannot be vindicated or defended. I have used no artifice to make or continue a reputation as physician, depreciated no author, bribed none by flattery or unjust praise, and with those differing with me I have not encouraged reports against their morals. In conclusion I would say to critics, if this treatise should drop into oblivion, let it teach you not to take too much pains to destroy that which will die of itself.

“Truth bows at no human shrine, seeks neither place nor applause, she only asks a hearing.” And if our words upon the effects of malaria have been many, they are not wasted if they but do inspire some ambitious brother to investigate. Therefore I can only hope that whatever mistakes of reasoning may occur in this treatise, these very errors may lead some one more capable to define the real nature and effects of the poison of malaria—effects so unlike any other, that only those who have experienced and observed them by the aid of a knowledge of the pathological conditions produced, are able to fully realize and place a proper estimate upon their significance.

“ He that writes,  
Or makes a feast, more certainly invites  
His judges than his friends ; there's not a guest  
But will find something wanting  
Or ill-dressed.”

